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Learning from the past: Antarctic Eemian ice sheet dynamics as an analogy for future warming.

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Facing considerable warming during this century the stability of the West Antarctic Ice Sheet is under increasing scrutiny. Recent observations suggest that the marine ice sheet instability of the WAIS has already started . We investigate the dynamic evolution of the Antarctic Ice Sheet during the last interglacial, forcing a state of the art 3D ice sheet model with Eemian boundary conditions. We elucidate the role of ocean warming and surface mass balance on the coupled ice sheet/shelf and grounding line dynamics. Special focus lies on an ice sheet modeling assessment of Antarctica's potential contribution to global sea level rise during the Eemian. The transient model runs are forced by time slice experiments of a fully coupled atmosphere-ocean global circulation model, as well as different sets of sea level and bedrock reconstructions. The model result show strong evidences for a severe ice-sheet retreat in West Antartica, leading to substantical contribution to global sea level from the Southern Hemisphere. Additionally we compare future warming scenarios of West Antarctic Ice Sheet dynamics to our paleo ice sheet modeling studies.